

Ground System Architecture Workshop 2000

The Impact of Team Performance on Design Costs

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INTRODUCTION

JPL and other aerospace organizations have been undergoing numerous changes in the way we do business in order to meet the demands of Cheaper, Faster, Better.

This has required radical changes in:

- Tools and infrastructure

- Processes (Reengineering, Concurrent Engineering)

While these have changed much in how we work they rarely fulfill their expectations.

What is only just beginning to be addressed is the part played by people and teams.

CURRENT STATE OF MISSION DEVELOPMENT

We have learned Model-Based Process and Technology Alone Can Reduce Product Development Time By 38% (A Result Demonstrated in Mission Design at JPL).

However

Starting to push concurrency to its limits

Increasing reliance on informal communication

TEAM EFFICIENCIES AND INNOVATION

Organizational Dynamics Literature

Innovators report greater likelihood of voicing novel ideas when they are:

- Satisfied with work
- Perceive their supervisors as effective managers of voiced ideas. (leadership)

Innovation and creativity is enhanced when there is

- Trust
- Participative safety

Motivation (to exert effort) and participative safety is enhanced by fair, constructive assessment and feedback.

When team and individual values are aligned with clearly articulated organizational values (vision/mission/purpose), decision-making is more efficient throughout the organization.

STUDY OBJECTIVES

Measure and validate impact of team performance on mission development cost and schedule

Develop cost model based on interaction of concurrency, schedule compression and team performance (CalTech Economics Department)

First Step is to prototype measurement and team feedback methodology and tools

First application is with advanced design teams because can observe a large number of studies in short time period

JPL

TRW

Aerospace

GSFC

ADVANCED DESIGN TEAM STUDY METHODOLOGY

Each team defines own statements to be used in evaluating optimal team performance, which forms the bases for the Team Behavioral Tool

The statements are grouped into a set of 12 common categories to focus on key performance areas and to support cross team comparisons.

Team members provide input once for each study, which is best if followed immediately with a discussion

Statements collected and summaries provided via a web based tool supported at JPL

THE TEAM BEHAVIORAL TOOL

Mechanism For Optimizing Performance And Satisfaction

‘Owned’ By Team Because Created By Team (Reflects Team Values)

Mechanism For Continual Self-Assessment And Feedback

Offers Format For ‘Just In Time’ Interventions To Meet Specific Needs

Mechanism For Ensuring Ongoing Participative Safety (Enhanced Opportunity For Synergy)

A Living Tool

CATAGORIES

Commitment

Goals and Objectives

Leadership (Shared)

Creativity

Growth (Personal & Group)

Mutual Accountability

Trust

Participation (Interaction Frequency)

Feelings Expressed

Good Listening

Clear Decision-Making Method

Self-Assessment (How Functioning)

Examples of Team Statements

Trust

When conflicts surfaced during this study, the issues were raised for everyone to consider and respond to.

I feel all team members respected each other's opinions and expertise during this study.

Participation

I felt encouraged to express my viewpoints during this study

I feel that all viewpoints were encouraged during this study.

Feelings Expressed

I felt encouraged to express my feelings freely during this study.

I felt that all team members were encouraged to express their feelings during this study.

Good Listening

I felt that, when I spoke, other team members gave me their full attention during this study.

Team members gave their attention to the appropriate person(s) participating in the pertinent discussion(s).

Example of graphs

WHERE DO WE GO FROM HERE?

JPL has been using the methodology since January 99. It is slowly opening discussions into areas that are stressing the team and hampering optimal performance. Just getting started with other teams and initiating new participants

CalTech has started work on an analytical model funded by NASA's Intelligent Synthesis Environment (ISE)

Forming Team Laboratories at several Universities to study team interactions in a project setting